

The Czech nuclear showdown enters the final straight

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The repeatedly delayed expansion of the Czech Republic's nuclear power plants has recently started to take concrete shape. The next two years should see the signature of a binding contract for the construction of the fifth unit at the Dukovany nuclear power plant (NPP), which is expected to cover around 10% of the country's electricity demand. There are long-term plans to build another unit at this plant, as well as two additional units at the other Czech nuclear power plant at Temelín. The US-Canadian company Westinghouse, France's Framatome (EDF Group) and South Korea's KHNP are bidding for the Dukovany contract. This line-up of potential contractors results from a decision by the previous government to exclude Russian and Chinese bidders from the tender. The Czech Republic has also taken other steps to wean itself off its dependence on Russia in the nuclear power sector: it has decided to replace the Russian supplier of nuclear fuel for the NPP Temelín and regained control of the key Czech nuclear company Škoda JS from a Kremlin-linked company.

The Czech Republic is one of the European Union's most coal-dependent countries, along with Poland and Germany. The prospect of a transition to low-carbon energy sources, which has been made necessary by the EU's energy and climate policy as well as the gradual depletion of the country's coal reserves, has put the topic of nuclear capacity expansion high on the Czech public agenda. In recent years, nuclear power plants have accounted for more than a third of the Czech Republic's electricity production (see Appendix). They are expected to eventually replace a significant part of the coal sector, which is still the main generator of electricity (40–50%, although the trend is downward). Other related issues include how to ensure a sufficient supply of electricity for the forthcoming era of electromobility, and how to potentially develop the hydrogen economy, in which the key element comes from the energy-intensive process of water electrolysis.

The link between the future of the country's energy sector and nuclear power has a direct bearing on the Czech government's priorities in negotiations on the EU's energy and climate policy. The Czech political elites consider it essential to maintain the position of nuclear energy as a low-carbon source on a par with renewables. This brings the Czech position closer to that of other Visegrad countries and the EU's largest nuclear power, France, but it also raises potential tensions with neighbouring Austria. The Austrian government has traditionally been sceptical of these sources, and Austrian opponents of nuclear power plants, whether senior politicians or third-sector activists, have regularly



clashed with the Czech Republic and Slovakia on the matter. However, they have been unable to block either the commissioning of the NPP Temelín in the Czech Republic or the ongoing expansion of the NPP Mochovce in Slovakia. The implementation of this policy is aided by the Czech public's positive attitude towards nuclear energy: 72% of the country's population now support its development.¹ This unprecedented figure, as well as the desire to achieve independence in electricity production (a demand supported by up to 97% of the Czech people), have been driven by the uncertainty surrounding the decoupling from Russian hydrocarbons and the earlier setbacks that resulted from the overinflated support for the development of solar energy.² These determinants mean that the calls for the development of nuclear energy are hardly ever contested in mainstream public debate.³

The failure to expand Temelín and the dispute over the role of Russia and China at Dukovany

The current debate on expanding the NPP Dukovany was preceded by efforts to expand Temelín, the newer of the two Czech nuclear power plants. When ČEZ launched a public procurement procedure in 2009, it was estimated that this was the country's largest ever tender valued at €14–20 billion. Even back then, the national security implications of the choice of supplier were an important topic of public debate. The final round saw a faceoff between bids from the US-based Westinghouse (which was owned by Japanese capital at the time) and Russia's Rosatom (the MIR.1200 consortium), which were supported by the administrations in Washington and the Kremlin respectively. However, ČEZ eventually ended the tender in spring 2014 without selecting a winner.⁴ This partly stemmed from disagreements between the Czech company and the government of Bohuslav Sobotka, elected six months earlier, over the mechanism for a guaranteed energy purchase price. The underlying cause may have been the earlier sudden collapse of the centre-right cabinet led by Petr Nečas, which was more determined to resolve the issue of nuclear power expansion. The deepening dispute between the government in Prague and the French company Areva may also have been of some significance: after being excluded from the negotiations, Areva challenged the decision in the Czech Republic and before the European Commission.⁵

The failure of the project to expand the NPP Temelín shifted the focus of the Czech public debate on nuclear power development to the older NPP Dukovany, with a view to the approaching decommissioning of its four units (in a gradual process between 2035 and 2037; or, after a possible extension of their operation, between 2045 and 2047). However, this choice still raises controversy among experts. Those who favour the continued prioritisation of the Temelín expansion project have pointed out that it would not entail the need to limit the tender requirements to units with a maximum capacity of 1200 MW, as is the case with

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¹ A figure from an IBRS survey carried out in October/November 2022. IBRS regularly carries out such surveys, and similarly high level of support (71%) was last recorded in 2009. See 'Průzkum: Jadernou energetiku v Česku podporuje 72 procent obyvatel, podpora roste', Radio Prague International, 28 November 2022, [cesky.radio.cz](https://www.radio.cz/en/news/111667).

² See J. Groszkowski, 'A solar scandal in the Czech Republic and its implications', OSW, 27 February 2013, [osw.waw.pl](https://www.osw.waw.pl/en/publikacje/artykuly/a-solar-scandal-in-the-czech-republic-and-its-implications).

³ The development of Czech nuclear power is even supported by the Czech Pirate Party, which is part of the ruling coalition and whose MEPs are members of the Greens faction in the European Parliament – together with the staunch opponents of this technology from Germany. See 'Pirátská jaderná energie', Česká pirátská strana, pirati.cz.

⁴ The US-based Westinghouse (owned at the time by Japan's Toshiba) and a consortium led by Russia's Rosatom advanced to the final round. The former had an advantage at the preliminary evaluation stage.

⁵ See M. Gniazdowski (ed.), *Projekty jądrowe w Europie Środkowej i Południowo Wschodniej. Stan i perspektywy*, OSW, Warszawa 2015, [osw.waw.pl](https://www.osw.waw.pl/).

the NPP Dukovany.⁶ The advantages of locating the project in Temelín include the greater availability of water to cool the reactors (from the River Vltava), better transport connections, and the fact that land issues in the areas of potential expansion have already been settled. The head of the State Office for Nuclear Safety, Dana Drábová, also believes that this location is better, and admits that the choice of Dukovany is mainly motivated by ‘pragmatic’ issues related to the need to replace the units that will be shut down sooner.⁷ Regardless of the final decision, the project to expand nuclear power is seen (for example, by ČEZ and its subcontractors) as a tool to maintain the Czech nuclear engineering competence that has been developed over the decades. For example, Plzeň-based Škoda JS (now under the control of ČEZ) manufactured the VVER-440 reactors for the third and fourth unit of the NPP Mochovce (the third unit is coming online around now). ÚJV Řež (majority-owned by ČEZ) provides industrial design and engineering services, Sigma Group (controlled by Czech private capital through a Cypriot company) manufactures pumps for nuclear power plants, while I&C Energo (owned by a Slovak investor with strong business connections in the Czech Republic) is a supplier of command & control systems for such power plants.

Initially, state-owned entities from Russia and China had hoped to win the tender for the expansion of the NPP Dukovany after declaring their interest in the project, but they were ultimately excluded from the competition. Events in the spring of 2021, two months before the key parliamentary votes on the so-called *lex Dukovany*, contributed to the elimination of Rosatom. Serious tensions in bilateral relations were caused when it was established that Russia was involved in the blast at an ammunition depot in Moravia, an incident which culminated in the expulsion of a record number of Russian diplomats from the Czech Republic, triggering retaliatory steps by the Kremlin.⁸ This led to a shift in the public debate and a sharp retreat from cooperation with authoritarian regimes. Both Rosatom and the China General Nuclear Power Group (CGN) enjoyed the support of Miloš Zeman, the Czech president between 2013 and 2023. However, the mere possibility that they would take part in the tender sparked resistance from a substantial part of the political class, especially the centre-right, as well as commentators in the mainstream liberal media. They pointed to warnings issued by the Czech counterintelligence service (BIS), whose annual public reports highlighted the dangers related to the reported activities of Russian and Chinese secret services in the Czech Republic, as well as the risks of entrusting the nuclear project to companies from ‘authoritarian states’.⁹ Babiš tacked back and forth on the issue for most of his time as the head of government, not least because of his tactical alliance with President Zeman, which was essential for the survival of his minority coalition. He also occasionally appealed to the moderately pro-Russian Czech electorate, for example by criticising the effectiveness of the sanctions against Russia which were imposed after it annexed Crimea. On the other hand, Babiš was never enthusiastic about a rapprochement with China, such as was pushed by Zeman and some politicians from his then coalition partner, the Social Democrats. Babiš also criticised the Kremlin’s aggressive stance, and his government pursued Czech participation in efforts to bolster NATO’s eastern flank.¹⁰



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⁶ The limitation of the unit’s capacity is due to the technical and environmental limits of the entire power plant, where the total capacity should not exceed 3250 MW. As commissioning a new medium-sized unit (1450 MW) would exceed this limit, one of the units already in operation would have to be shut down prematurely. See ‘Nový jaderný zdroj v lokalitě Dukovany’, Skupina ČEZ, cez.cz.

⁷ D. Tramba, ‘Dukovany, nebo Temelín? To je otázka, která štěpí fanoušky jádra’, *Ekonomický deník*, 2 March 2021, ekonomickydenik.cz.

⁸ See M. Gniadzowski, M. Wasiuta, ‘Russian attacks in the Czech Republic: domestic context, implications, perspectives’, OSW, 20 April 2021, osw.waw.pl.

⁹ See ‘Výroční zpráva Bezpečnostní informační služby za rok 2019’, Bezpečnostní informační služba, 10 November 2020, bis.cz.

¹⁰ See K. Dębiec, ‘A crisis in the Czech Republic’s relations with China and Russia’, OSW, 2 October 2019, osw.waw.pl.

This debate was closed shortly before the 2021 elections when the president signed a series of legislative amendments prepared by the Babiš government which excluded entities controlled by Beijing and Moscow from the nuclear tender.¹¹

The political decision to exclude China was taken even before the similar move against Rosatom.¹²

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This was part of the negative spiral

into which Czech-Chinese relations had descended in the previous years. The decision was prompted by the general disappointment at the lack of tangible results from the Czech Republic’s ‘strategic partnership’ with China. The agreement that was meant to initiate this special relationship, which President Zeman and President Xi Jinping signed in Prague in the spring of 2016, resulted mainly in inconsistent portfolio investments by Chinese companies in the Czech Republic. There are indications that instead of bringing the expected economic benefits to the Czech Republic, these investments were mostly aimed at building political influence. Indeed, the expected investments with high added value, especially greenfield and brownfield projects, did not materialise; neither did the heavily regulated Chinese market open up to more Czech entities. The only beneficiaries were individual Czech entities that had already been active in China, most notably the PPF group; at that time, it was owned by the richest man in the Czech Republic, Petr Kellner (who died in 2021), who enjoyed Zeman’s patronage. The decision to exclude Chinese entities from the programme came at a time when Czech politicians who favoured the development of bilateral relations were marginalised: this refers to the left (within the ČSSD), and to a lesser extent the right (within the ODS). The breakdown in Chinese-Czech relations worsened even more after China’s 2018 detention of Ye Jianming; he was the head of CEFC, the company that had been driving Chinese investments in the Czech Republic. Another contributing factor was the Czech government’s political rapprochement with the US, and related warnings from Czech officials against the use of Chinese telecommunications technologies.

The ‘de-Russification’ of the Czech energy sector

The Russian invasion of Ukraine led to a further loosening of ties with Russia in the area of nuclear energy. In April 2022, Petr Fiala’s centre-right government decided that a consortium of Westinghouse and Framatome would replace TVEL (a subsidiary of Rosatom) as the supplier of nuclear fuel to the NPP Temelín from 2024. The contract that the owner and operator of the plant (the ČEZ Group) signed with the two Western companies in June 2022 stipulates that they will supply fuel for ‘more than 10 years’.¹³ Another important step was the takeover of a key nuclear engineering company, Škoda JS, from Russian capital; ČEZ has been in full control of this firm since November 2022. Previously, between 2004 and 2022, it was controlled by the Gazprombank-owned Russian company OMZ (registered in the Netherlands). The acquisition of Škoda JS by ČEZ, its main customer, allowed the company to be removed from the US sanctions list after eight years (it was included because of its Russian owner) and to avoid potential EU restrictions. Rosatom – or more specifically its machinery division Atomenergomash – still owns Arako, a major Czech manufacturer of industrial fittings, including those

¹¹ Formally, the statutory provision concerned their exclusion from the construction of power plants that included nuclear reactors with a capacity of at least 100 MW. It referred to suppliers (including those indirectly involved in the construction) from countries that had not acceded to the Agreement on Government Procurement (GPA), an international agreement under the auspices of the WTO. Neither Russia nor China is a party to it. See Zákon č. 367/2021 Sb. o opatřeních k přechodu České republiky k nízkouhlíkové energetice a o změně zákona č. 165/2012 Sb., o podporovaných zdrojích energie, ve znění pozdějších podpis, [zakonyprolidi.cz](https://www.zakonyprolidi.cz/Sn/2021/367); Sněmovní tisk 966 – VI.n.z.o opatřeních k přechodu ČR k nízkouhlíkové energetice, Poslanecká sněmovna Parlamentu České republiky, [psp.cz](https://www.psp.cz).

¹² See K. Dębiec, J. Jakóbowski, ‘China excluded from a Czech nuclear tender’, OSW, 2 February 2021, osw.waw.pl.

¹³ ‘We are strengthening the energy security of the Czech Republic: we have signed contracts for the supply of fuel assemblies with Westinghouse and Framatome’, Skupina ČEZ, 28 June 2022, cez.cz/en.

used in nuclear power. The exclusion of Rosatom and CGN from the tender for the expansion of the NPP Dukovany was also a blow to the Czech machinery company Žďas. This Chinese-owned firm generated 20% of its turnover from the sale of its products on the Russian market and had hoped for further growth, including through supplies to Rosatom.

The exclusion of Russian entities from the project to expand Czech nuclear power plants, the partial termination of nuclear fuel supplies from Russia and the takeover

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of a key nuclear engineering company are part of the broader context of Czech efforts to ‘de-Russify the energy mix’ following the Russian invasion of Ukraine. As part of these efforts, the government has reserved capacity at the FSRU terminal in Eemshaven, the Netherlands, for five years (from September 2022), which will meet around a third of the country’s gas demand.¹⁴ The tightening of gas storage regulations has led to the recovery of the storage capacity that had been reserved by Gazprom but which the Russian company left unused. As regards oil, the shareholders of the TAL oil pipeline decided in late November 2022 to increase its capacity at the request of the Czech company Mero.¹⁵ Within a little more than the next two years, this will probably lead to the country’s full independence from Russian oil supplies (which at present is only at around 50%).

Towards the new

Invitations to participate in the Czech tender for the construction of a new unit at the NPP Dukovany were finally extended to Westinghouse, Framatome and KHNP, all of which submitted their preliminary bids by the deadline of 30 November 2022. During the talks with ČEZ, these bids will be updated by September 2023, and then the Czech company will submit an evaluation of the final submissions, including a ranking of the bidders, to the government. The signing of a binding contract is expected in late 2024. A detailed follow-up schedule will be agreed with the winner of the tender, but the reactor is expected to be test-run in 2036 and fully connected to the grid two years later. In parallel, ČEZ has received non-binding bids (‘options’) from the three companies to construct another unit at the NPP Dukovany and two more units at the NPP Temelín (in a longer timeframe). However, this is not formally linked to the outcome of the main tender. In the long term, the government has high hopes for small modular reactors (SMRs); these should require lower capital expenditure, not only in total, but also per unit of installed capacity. ČEZ plans to select a supplier as early as next year for the first SMR to be installed at the NPP Temelín and connected to the grid between 2032 and 2035.¹⁶ On this matter, the Czech company is in contact with seven potential foreign bidders, three of which are seen as the favourites: the US-Japanese company GE Hitachi, the US-based NuScale and Britain’s Rolls-Royce.¹⁷ In late February, ČEZ also selected locations for the next SMRs (for the period after 2035): these are the current sites of the coal-fired power plants at Dětmarovice (near Ostrava) and Tušimice (in the Ústí nad Labem region).

¹⁴ See K. Dębiec, ‘Czechy z udziałem w holenderskim terminalu LNG EemsEnergyTerminal’, OSW, 16 September 2022, osw.waw.pl.

¹⁵ See K. Dębiec, ‘The TAL is expanding: the Czech Republic is gaining independence from Russian oil supplies’, OSW, 7 December 2022, osw.waw.pl.

¹⁶ See D. Tramba, ‘Modulární reaktor do Temelína dodá jeden ze sedmi uchazečů. Který z nich má šanci uspět?’, *Ekonomický deník*, 21 January 2023, ekonomickydenik.cz.

¹⁷ The other suppliers are the US-based Holtec International (which offers the Holtec SMR-160 reactor), France’s EDF (Nuward) as well as the two companies which are also participating in the tender to expand the NPP Dukovany: KHNP (SMART/iSMR) and Westinghouse (300 MW Westinghouse SMR).

There is no runaway favourite in the tender for the fifth unit of the NPP Dukovany, but Westinghouse is closest to being considered the frontrunner. The Pennsylvania-based US concern, controlled since 2018 by Canada's Brookfield Business Partners (a subsidiary of the investment firm Brookfield Asset Management), has been active in the Czech nuclear sector for years. Under a contract signed in 1993, Westinghouse deployed its instrumentation and control (I&C) systems at the NPP Temelín to replace Soviet technology. It was the only current bidder that participated in the tender to extend this plant, which ended inconclusively, and its bid came first in the preliminary evaluation. After the NPP Temelín was built, Westinghouse supplied nuclear fuel to the plant until 2010 (through a production facility in Sweden), and will be its supplier again from 2024. In the current tender for the NPP Dukovany, Westinghouse is the only bidder that is offering a finished product, while the others have to make their reactors smaller to match the order's parameters. This has also fuelled speculation that the tender was designed to favour the US company. The selection of its bid would be seen as a confirmation of the centre-right ruling coalition's clearly pro-Atlantic orientation. It can be assumed that in such a situation, it would be easier for the Czech government to obtain preferential US terms in other transactions to be concluded under the bilateral intergovernmental agreement, such as the announced purchase of F-35 fighter jets.

The French side is running a relatively intensive media campaign in support of its bid. Framatome, which is 75.5% owned by Élec-

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tricité de France (EDF; 84.5% of its shares are controlled by the French state), stresses that although its proposal may not be the cheapest, it offers 'the highest quality'. At the same time, the company has emphasised that selecting its bid would strengthen the Franco-Czech partnership and guarantee a large participation of Czech companies in the project: up to two-thirds of the contract value. However, Framatome is focused on the production of EPR reactors with a capacity of more than 1600 MW, so it would have to develop a new model for the Czech order. Selecting the French bid would signal that the Czech government is seeking to deepen its cooperation with France, perhaps in the hope of gaining its support in future EU negotiations on important issues for the Czech Republic, such as energy and climate policy.

The bid from South Korea's KHNP (Korea Hydro & Nuclear Power, part of the Korea Electric Power Corporation KEPCO, which is majority-owned by the South Korean government) is said to offer the best price. The Korean company has emphasised that it is the only bidder willing to cooperate with the major Plzeň-based turbine manufacturer Doosan Škoda Power, a Czech company controlled by private South Korean capital. However, KHNP produces 1400 MW reactors, and like Framatome, would have to develop a new model for the current tender; that involves the risk of delays. The Czech government could justify this choice in terms of wanting to allocate the resulting financial savings to other important purposes, such as the development of the country's road infrastructure or social policy.

Prospects

In recent years, investments in nuclear power have frequently suffered from long delays in their implementation, leading to significant cost overruns. Even according to original calculations, the projected outlays are enormous, especially for the budget of a relatively small country like the Czech Republic. Neighbouring Slovakia has repeatedly delayed the launch date of two more units at the NPP Mochovce: the third unit was originally due to start operating in 2013, but will most likely come fully online a decade later, while the costs have risen from the planned €2.8 billion to €6.2 billion. The Czech Republic is also facing major challenges in keeping to the project's timetable and its financing model. The previous government under Andrej Babiš delayed decisions on the tender procedure, but still

managed to adopt the financing model for the project in mid-2020.¹⁸ The ownership structure of ČEZ, which is the owner and operator of both nuclear power plants, makes it difficult to agree on detailed financing issues. Although the state holds 70% of the company's shares, the remainder is in the hands of minority shareholders, who act in a coordinated manner and resist actions that could carry business risks and undermine the share price in the short term. In order to facilitate the expansion of nuclear power, the Fiala government is trying to carve out a wholly state-owned entity from the company which would be responsible for energy production.

A number of domestic and foreign factors are constraining Czech investments in the development of nuclear power. On the other hand, these plans enjoy broad political and public support in the country. The pressure of time also should help accelerate the work, as the older nuclear units are due to be decommissioned while the coal-fired plants were shut down earlier. The political climate in the EU is also a favourable factor. Nuclear power has retained its 'clean' status, while the retreat from Russian hydrocarbons and the EU's low-carbon transition strategy favour both nuclear power and renewables. The growing interest in developing nuclear projects in Central Europe seen since the start of the energy crisis in 2021 is another favourable trend.

APPENDIX

Nuclear power in the Czech Republic

Two nuclear power plants operate in the Czech Republic, at Dukovany and Temelín. They are owned and operated by the ČEZ Group. The NPP Dukovany produced 14.73 TWh of electricity in 2022 (a drop of 0.14 TWh y-o-y) while the Temelín NPP produced 16.29 TWh (a rise of 0.43 TWh y-o-y) – together the highest annual volume of electricity supplied to the grid in the history of the Czech energy sector. The two power plants together generated more than 36.7% of the country's electricity last year.¹⁹ Czech nuclear power plants are not used for heating purposes.

Table. Operating and planned nuclear units in the Czech Republic

Power plant	Reactors			Planned expansion
	Type	Capacity	Planned decommissioning	
Dukovany	VVER-440	4 × 510 MW	2035–7, with a possible 10-year extension	1 unit of 1000–1200 MW to come online in 2036 at the earliest, the other unit at an unspecified later date
Temelín	VVER-1000 (V-320)	2 × 1125 MW	2060–2	2 units at an unspecified later date

¹⁸ The financing model assumes that the state will provide ČEZ with an interest-free loan during the construction of the next unit at the NPP Dukovany, with an interest rate of 2% once it is operational. The estimated cost of construction is 162 billion Czech crowns (around \$7.6bn). The state will cover 70% of the construction costs while the company will cover the rest, including any unforeseen additional expenses. ČEZ and the Ministry of Industry and Trade signed an agreement to this effect on 28 July 2020. In autumn 2020 the parliament adopted a mechanism for setting the power purchase price. This also specified that the costs associated with the difference between this price and the market price would either be passed on to consumers or compensated by lower tariffs, depending on the outcome of this measure. State funding requires the European Commission to be notified; the procedure in this regard was initiated by the EC in June 2022, and the maximum time to complete it is 18 months. See 'State Aid: Commission opens in-depth investigation into Czech support for new nuclear power plant in Dukovany', European Commission, 30 June 2022, ec.europa.eu.

¹⁹ See 'Čtvrtletní zpráva o provozu elektrizační soustavy ČR za IV. čtvrtletí 2022', Energetický regulační úřad, 16 February 2023, eru.cz.

The NPP Dukovany is located on the border between the South Bohemia and Vysočina regions, about 20 km west of Brno as the crow flies, and some 30 km from the Austrian border. It operates four production units with VVER-440 reactors: construction of the plant began in 1978, the first reactor came online in 1985, and the last in 1987. In order to improve the operational efficiency, their capacity was gradually increased (until 2012) from the original 4×440 MW to 4×510 MW today. The NPP Dukovany is the first nuclear power plant on the territory of the Czech Republic, although at the time of its launch it was the second such plant in Czechoslovakia, after the NPP Bohunice in Slovakia. The Dukovany plant is scheduled to operate until 2035–7, with the possibility of a 10-year extension. A long-suspended project to connect the Brno district heating network to the plant was resumed in 2022.

The NPP Temelín is located in the South Bohemia region, about 25 km north of České Budějovice and some 50 km from the Austrian and German borders. It operates two production units with VVER-1000 reactors (V-320 type). Its construction began in 1987, but in 1993, just after the beginning of the political and economic transition, a decision was taken to reduce the number of planned units from four to two. The construction process was accompanied by intense public debate and disputes with neighbouring Austria. Eventually, the units were connected to the electricity grid in 2002–3. Their installed capacity after upgrades is 2×1125 MW. The commissioning of the NPP Temelín made the southern part of the Czech Republic independent of power supplies from other regions, mainly from the northern part of the country, which relies on coal power. It also facilitated the decision to shut down some of the coal-fired units in the north, which were mostly old and environmentally harmful. According to ČEZ, the Temelin plant can operate at least until 2062 (the first unit for two years' less time).